

PATENT CLAIMS

1. Glass-ceramic, comprising beta-quartz and/or
5 keatite solid solutions having a surface roughness
without polishing of $R_a < 50 \text{ nm}$, a thermal
expansion in the temperature range between 20°C
and 300°C of $< 1.2 \cdot 10^{-6}/\text{K}$, a transmission in the
near infrared region at 1050 nm of $> 85\%$ for a
10 thickness of 4 mm, and a composition in % by
weight, based on the total composition,
containing:

	Li_2O	3.0-5.5
	Na_2O	0-2.5
15	K_2O	0-2.0
	$\Sigma \text{Na}_2\text{O} + \text{K}_2\text{O}$	0.5-3.0
	$\Sigma \text{MgO} + \text{ZnO}$	< 0.3
	SrO	0-2.0
	BaO	0-3.5
20	B_2O_3	0-4.0
	Al_2O_3	19.0-27.0
	SiO_2	55.0-66.0
	TiO_2	1.0-5.5
	ZrO_2	0-2.5
25	$\Sigma \text{TiO}_2 + \text{ZrO}_2$	3.0-6.0
	P_2O_5	0-8.0
	Fe_2O_3	< 200 ppm
	F	0-0.6

30 and, if appropriate, at least one refining agent,
such as As_2O_3 , Sb_2O_3 , SnO_2 , CeO_2 , sulphate and
chloride compounds.

2. Glass-ceramic according to Claim 1, comprising
35 beta-quartz solid solutions as the main crystal
phase, having a thermal expansion in the
temperature range between 20°C and 300°C of < 0.5
 $\cdot 10^{-6} \text{ K}$, a transmission in the near infrared

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region at 1050 nm of > 87%, preferably > 89% for a thickness of 4 mm, and a composition in % by weight, based on the total composition, containing:

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	Li ₂ O	3.0-5.5
	Na ₂ O	0-2.0
	K ₂ O	0-1.5
	Σ Na ₂ O+K ₂ O	0.5-2.5
10	Σ SrO+BaO	< 4.0
	Σ TiO ₂ +ZrO ₂	3.5-5.5
	Σ B ₂ O ₃ + P ₂ O ₅	1.0-8.0
	Fe ₂ O ₃	< 130 ppm
	F	0-0.3

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and, if appropriate, at least one refining agent, such as As₂O₃, Sb₂O₃, SnO₂, CeO₂, sulphate and chloride compounds.

20 3. Glass-ceramic according to Claim 1, having a composition in % by weight, based on the total composition, containing:

	Li ₂ O	3.0-5.0
25	Na ₂ O	0-2.0
	K ₂ O	0-1.5
	Σ Na ₂ O+K ₂ O	0.5-2.0
	Σ SrO+BaO	< 3.0
	B ₂ O ₃	0-3.0
30	Al ₂ O ₃	21.0-27.0
	TiO ₂	1.5-5.5
	Σ TiO ₂ +ZrO ₂	3.5-5.0
	Σ B ₂ O ₃ + P ₂ O ₅	1.0-8.0

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and, if appropriate, at least one refining agent, such as As₂O₃, Sb₂O₃, SnO₂, CeO₂, sulphate and chloride compounds.

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4. Glass-ceramic according to Claim 1, having a composition in % by weight, based on the total composition, containing:

5	Li ₂ O	3.5-5.0
	Na ₂ O	0-2.0
	K ₂ O	0-1.5
	Σ Na ₂ O+K ₂ O	0.5-2.5
	Σ SrO+BaO	1.0-4.0
10	Al ₂ O ₃	20-25
	SiO ₂	55-63
	TiO ₂	1.5-5.5
	ZrO ₂	0-2.0
	Σ TiO ₂ +ZrO ₂	3.5-5.0
15	P ₂ O ₅	1.0-8.0
	Σ B ₂ O ₃ +P ₂ O ₅	2.0-8.0

and, if appropriate, at least one refining agent, such as As₂O₃, Sb₂O₃, SnO₂, CeO₂, sulphate and chloride compounds.

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5. Glass-ceramic according to at least one of Claims 1 to 4, in which the mean crystallite size is < 300 nm, preferably < 80 nm.
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6. Glass-ceramic according to at least one of Claims 1 to 5, which on the surface has a vitreous layer, which is up to 1.5 µm thick, with increased Na₂O, K₂O and/or SrO, BaO contents, and the increase in the surface roughness during the ceramicization of the glass-ceramic compared to the starting glass is less than 10 nm, preferably less than 5 nm.
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7. Glass-ceramic according to at least one of Claims 1 to 6, additionally containing at least one coloured oxide which absorbs in the visible region but does not absorb or absorbs only to a slight
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extent in the near infrared region, preferably V₂O₅.

8. The glass-ceramic as claimed in at least one of Claims 1 to 7, which has a high temperature/time load-bearing capacity with regard to compaction of < 60 µm/100 mm after conditioning at 600°C, 200 h.
- 5 9. Glass-ceramic according to at least one of Claims 1 to 8, which has a high IR transmission of > 85%, preferably > 87%, for a thickness of 4 mm, in the wavelength range between 900 nm - 1800 nm.
- 10 10. Glass-ceramic according to at least one of Claims 1 to 9, in which the light transmission of the glass-ceramic is > 50%, preferably > 85%, for a thickness of 4 mm.
- 15 11. Glass having a composition in accordance with at least one of Claims 1 to 4.
- 20 12. Glass according to Claim 11, which has a thermal expansion in the temperature range between 20°C and 300°C of < 5 • 10⁻⁶/K, preferably of < 4.5 • 10⁻⁶/K and a transformation temperature Tg of > 600°C.
- 25 13. Glass according to Claim 11 or 12, which has an IR transmission of > 85%, preferably > 87%, for a thickness of 4 mm, in the wavelength range between 900 nm - 1800 nm.
- 30 14. Glass according to Claim 11 or 12, which has a light transmission of > 85% for a thickness of 4 mm.
- 35 15. Reflector having an inner contour which approaches one or more parabolas, containing glass and/or

glass-ceramic according to at least one of Claims 1 to 14.

16. Reflector according to Claim 15, which has an IR-transmitting mirror coating, which preferably contains layer sequences of various oxide layers with different refractive indices, such as SiO₂/TiO₂.
- 10 17. Process for producing a vitreous substrate material, which can be converted into a glass-ceramic comprising beta-quartz and/or keatite solid solutions, for coating with a mirror coating, the shaping taking place via a feeder, in which a molten drop of defined weight is added to a pressing die, and the parabolic contour of the substrate material is pressed using a ram with a smoothed surface.
- 15 20 18. Process according to Claim 17, in which the conversion of the pressed vitreous substrate material into the glass-ceramic containing beta-quartz solid solution as the main crystal phase takes place at nucleation temperatures of 630°C to 750°C, for a duration of > 15 min and the crystallization takes place at temperatures of 700°C to 850°C for a duration of > 30 min.
- 25 30 19. Process according to Claim 17, in which the pressed vitreous substrate material is converted into a glass-ceramic with keatite solid solution as the main crystal phase at temperatures of from 780°C to 1000°C.
- 35 20. Use of a glass or a glass-ceramic according to at least one of Claims 1 to 19 as substrate material for coating in which, on account of a high

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luminous power, a high radiant heat combined with temperature differences has to be tolerated.

21. Use according to Claim 20, as a reflector, in
5 particular a cold-light reflector, substrate
material for a mirror coating and supplementary
plate in illumination engineering.